

Serial No.: 09/900,068 Filed: 07/06/2001  
Amendment dated: 10/15/2003  
Reply to Office Action of: 09/05/2003  
Atty. Docket No.: GJH-0102 (P1996J056B)

### REMARKS

#### CLAIM OBJECTIONS

Applicant again acknowledges the Examiner's renumbering of claim 22 to claim 21 and thanks the Examiner for doing so.

#### CLAIM REJECTIONS

##### FIRST REJECTION UNDER 35 U.S.C. 103

Claims 1-9 and 12-19 have been rejected under 35 U.S.C. 103(a) as being obvious in light of United States Patent Number 5,316,658, Ushio et al. ("Ushio").

#### EXAMINER'S POSITION

The Examiner takes the position that Ushio discloses a process for removing sulfur and nitrogen from a petroleum distillate comprising contacting the feed with hydrogen in first reaction zone to produce a first reaction zone effluent having a sulfur content of 0.05 wt.% (500wppm) or lower. The first reaction zone may employ a Co-Mo catalyst having a total amount of metals ranging from 1 to 30% by weight, and countercurrent flow may be used. A Ni-Mo on alumina catalyst is specifically disclosed as an effective second zone catalyst. The Examiner also summarizes the first and second reaction zone conditions.

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The Examiner points out that Ushio a) does not disclose the concentration of Co or Mo in the first reaction zone; b) does not disclose the nitrogen content of the first reaction zone effluent; and c) does not disclose the use of a second zone catalyst comprising Ni, Mo, and W. However, the Examiner takes the position that all of these features would have been obvious to one having ordinary skill in the art and knowledge of Ushio. Specifically, the Examiner states that it would have been obvious to modify the first zone catalyst of Ushio to within the presently claimed ranges because any concentration of the individual metals that would fall within the totals metals range of Ushio would be an effective catalyst. The Examiner also states that it would have been obvious to include W in the second catalyst because Ushio teaches that W has hydrotreating activity.

#### APPLICANTS' POSITION

It is applicants' position that one having ordinary skill in the art and knowledge of Ushio at the time the invention was made would not have found it obvious to arrive at the presently claimed invention.

Ushio discloses a process wherein "hydrodesulfurization is carried out mainly in the first step and hydrotreating to improve the color of the feedstock is carried out mainly in the second step." Ushio, col.3, lines 28-31. This is evidenced by a comparison of the conditions used in the first and second stage of Ushio. The first stage conditions are

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described at col.3, lines 32-51, and the second stage conditions are described at col.4, lines 37-61. The catalysts that can be used in the two stages can be the same or different, and the two reaction zones can be operated in a counter-current fashion.

The instantly claimed invention is a multistage process wherein sulfur and nitrogen are removed in both the first and second reaction stages. The second reaction stage of the instant invention also removes sulfur and nitrogen compounds from the "reacted feedstock" exiting the first reaction stage.

Removing sulfur and nitrogen in the second reaction stage is not taught in Ushio. As stated above, Ushio discloses a process wherein "hydrodesulfurization is carried out mainly in the first step and hydrotreating to improve the color of the feedstock is carried out mainly in the second step." This is further evidenced in the examples of Ushio. Table 1 of Ushio contains the results of the examples therein. As stated at col. 6, lines 30-34, the feedstock used in the examples of Ushio initially contained 10,000 wppm sulfur, i.e. 1.0 wt.%. In examples 1-4, the sulfur of the feedstream was reduced to 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. Thus, the feedstream exiting the first reaction stage of Examples 1-4 of Ushio and passed to the second reaction stage has a sulfur content of 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. The feedstream exiting the first reaction stage is then treated under conditions outlined in Table 1 with the catalysts outlined in Table 1. However, the sulfur content of the

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products from the second reaction stage of Ushio have a sulfur content of 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. Thus, the sulfur content of the product exiting the second reaction stage of Ushio is identical to the sulfur content of the feedstream fed to the second reaction stage, only the Saybolt Color has changed.

Thus, it is applicants' position that one having ordinary skill in the art and knowledge of Ushio would not have found the present invention obvious. One would not have been taught to remove sulfur and nitrogen in the second reaction stage of the Ushio process. Instead, one would have been taught to operate the second stage of Ushio to adjust color only.

The Examiner is requested to reconsider and withdraw this rejection.

**SECOND REJECTION UNDER 35 U.S.C. 103**

Claims 10 and 20 have been rejected under 35 U.S.C. 103(a) as being obvious in light of United States Patent Number 5,316,658, Ushio et al. ("Ushio") as applied above, and further in view of United States Patent Number 5,198,099, Trachte et al. ("Trachte").

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#### **EXAMINER'S POSITION**

The Examiner again states that Ushio does not disclose an additional reaction zone following the second reaction zone. However, the Examiner cites Trachte as disclosing the hydrocracking of a petroleum distillate that has been previously hydrotreated in a two-stage hydrotreatment process. Thus, the Examiner states that it would have been obvious to modify the process of Ushio to include the hydrocracking stage of Trachte.

#### **APPLICANTS' POSITION**

It is applicants' position that one having ordinary skill in the art and knowledge of Ushio and Trachte at the time the invention was made would not have found it obvious to arrive at the presently claimed invention. Claims 10 and 20 are dependent claims and by definition include all of the limitations of the claims from which they depend. Therefore, claims 10 and 20 include all of the limitations of novel, independent Claims 1, and 12, respectively.

Although applicants acknowledge that Trachte teaches a third stage that is a hydrocracking stage, the combination of Trachte and Ushio does not obviate the instantly claimed invention. As stated above, Ushio discloses a process wherein "hydrodesulfurization is carried out mainly in the first step and hydrotreating to improve the color of the feedstock is carried out mainly in the second step." Ushio, col.3, lines 28-

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31. This is evidenced by a comparison of the conditions used in the first and second stage of Ushio. The first stage conditions are described at col.3, lines 32-51, and the second stage conditions are described at col.4, lines 37-61. The catalysts that can be used in the two stages can be the same or different, and the two reaction zones can be operated in a counter-current fashion.

The instantly claimed invention is a multistage process wherein sulfur and nitrogen are removed in both the first and second reaction stages. The second reaction stage of the instant invention also removes sulfur and nitrogen compounds from the "reacted feedstock" exiting the first reaction stage.

Removing sulfur and nitrogen in the second reaction stage is not taught in Ushio. As stated above, Ushio discloses a process wherein "hydrodesulfurization is carried out mainly in the first step and hydrotreating to improve the color of the feedstock is carried out mainly in the second step." This is further evidenced in the examples of Ushio. Table 1 of Ushio contains the results of the examples therein. As stated at col. 6, lines 30-34, the feedstock used in the examples of Ushio initially contained 10,000 wppm sulfur, i.e. 1.0 wt.%. In examples 1-4, the sulfur of the feedstream was reduced to 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. Thus, the feedstream exiting the first reaction stage of Examples 1-4 of Ushio and passed to the second reaction stage has a sulfur content of 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively.

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The feedstream exiting the first reaction stage is then treated under conditions outlined in Table 1 with the catalysts outlined in Table 1. However, the sulfur content of the products from the second reaction stage of Ushio have a sulfur content of 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. Thus, the sulfur content of the product exiting the second reaction stage of Ushio is identical to the sulfur content of the feedstream fed to the second reaction stage, only the Saybolt Color has changed.

Thus, it is applicants' position that one having ordinary skill in the art and knowledge of Ushio and Trachte would not have found the present invention obvious. One would not have been taught to remove sulfur and nitrogen in the second reaction stage of the Ushio process. Instead, one would have been taught to operate the second stage of Ushio to adjust color only and then hydrocrack the product having adjusted color qualities.

The Examiner is requested to reconsider and withdraw this rejection.

### **THIRD REJECTION UNDER 35 U.S.C. 103**

Claims 11 and 21 have been rejected under 35 U.S.C. 103(a) as being obvious in light of United States Patent Number 5,316,658, Ushio et al. ("Ushio") as applied above, and further in view of United States Patent Number 3,425,810, Scott, Jr. ("Scott").

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#### EXAMINER'S POSITION

The Examiner again states that Ushio does not disclose the use of a reaction zone that contains a vapor passageway. However, the Examiner cites Scott as disclosing a hydrotreating apparatus that contains a vapor passageway through or around at least a portion of the catalyst bed. Thus, the Examiner states that it would have been obvious to modify the process of Ushio to include the vapor passageway stage of Scott.

#### APPLICANTS' POSITION

It is applicants' position that one having ordinary skill in the art and knowledge of Ushio and Scott at the time the invention was made would not have found it obvious to arrive at the presently claimed invention. Claims 11 and 21 are dependent claims and by definition include all of the limitations of the claims from which they depend. Therefore, claims 11 and 21 include all of the limitations of novel, independent Claims 1, and 12, respectively.

Although applicants acknowledge that Scott teaches a hydrotreating apparatus, the combination of Scott and Ushio does not obviate the instantly claimed invention. As stated above, Ushio discloses a process wherein "hydrodesulfurization is carried out mainly in the first step and hydrotreating to improve the color of the feedstock is carried out mainly in the second step." Ushio, col.3, lines 28-31. This is evidenced by a comparison of the conditions used in the first and second stage of Ushio. The first stage



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conditions are described at col.3, lines 32-51, and the second stage conditions are described at col.4, lines 37-61. The catalysts that can be used in the two stages can be the same or different, and the two reaction zones can be operated in a counter-current fashion.

The instantly claimed invention is a multistage process wherein sulfur and nitrogen are removed in both the first and second reaction stages. The second reaction stage of the instant invention also removes sulfur and nitrogen compounds from the "reacted feedstock" exiting the first reaction stage.

Removing sulfur and nitrogen in the second reaction stage is not taught in Ushio. As stated above, Ushio discloses a process wherein "hydrodesulfurization is carried out mainly in the first step and hydrotreating to improve the color of the feedstock is carried out mainly in the second step." This is further evidenced in the examples of Ushio. Table 1 of Ushio contains the results of the examples therein. As stated at col. 6, lines 30-34, the feedstock used in the examples of Ushio initially contained 10,000 wppm sulfur, i.e. 1.0 wt.%. In examples 1-4, the sulfur of the feedstream was reduced to 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. Thus, the feedstream exiting the first reaction stage of Examples 1-4 of Ushio and passed to the second reaction stage has a sulfur content of 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. The feedstream exiting the first reaction stage is then treated under conditions outlined in

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Table 1 with the catalysts outlined in Table 1. However, the sulfur content of the products from the second reaction stage of Ushio have a sulfur content of 470 wppm, 60 wppm, 420 wppm, and 400 wppm, respectively. Thus, the sulfur content of the product exiting the second reaction stage of Ushio is identical to the sulfur content of the feedstream fed to the second reaction stage, only the Saybolt Color has changed.

Thus, it is applicants' position that one having ordinary skill in the art and knowledge of Ushio and Trachte would not have found the present invention obvious. One would not have been taught to remove sulfur and nitrogen in the second reaction stage of the Ushio process. Instead, one would have been taught to operate the second stage of Ushio to adjust color only and then hydrocrack the product having adjusted color qualities.

The Examiner is requested to reconsider and withdraw this rejection.


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Based on the preceding arguments, the Examiner is requested to reconsider and withdraw all rejections and pass this application to allowance. The Examiner is encouraged to contact applicants' attorney should the Examiner wish to discuss this application further.

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Respectfully submitted:

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